Inventory and Monitoring of Bald Eagles and Other Raptorial Birds of the Snake River, Idaho

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INVENTORY AND MONITORING OF BALD EAGLES AND OTHER RAPTORIAL BIRDS OF THE SNAKE RIVER, IDAHO

1995 PROGRESS REPORT

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Executive Summary

The Snake River Raptor Project, a five-year effort, was initiated in 1994, with two primary objectives: 1) to monitor bald eagle productivity in Southeast Idaho, and 2) to develop a monitoring program for raptorial birds in the study area. The Snake River corridor is recognized for its productive bald eagles and diverse array of raptors.

In 1995, nesting bald eagles were monitored at 42 bald eagle breeding areas in Southeast Idaho. Of these 42 known territories, 39 were occupied, 29 were active, and productivity at occupied sites was 1.00 advanced young per occupied nest. Lower elevation nests were generally very productive (3 young at each of 4 nests), whereas those at higher elevations such as Island Park and Palisades Reservoir were notably poor. Three new breeding areas were located in 1995: Hog Hollow (18-IS-23) on the lower Teton River, Five Ways (18-IS-24) within a portion of what was the Pine Creek breeding area (18-IS-07), and Big Bend (18-IC-18) at what was the margin of the Moonshine (18-IC-11) and Last Chance (18-IC-12) breeding areas. We observed 5 nesting adults that were banded as nestlings in the GYE, and determined the natal nest of 3 of these adults. In 1995, 13 Idaho/GYE nestlings were banded to facilitate future population monitoring.

In 1994 and 1995, we recorded presence/absence surveys in 437 randomly selected sample quadrats, with at least one raptor detected in 179 sample quadrats, and no birds seen in 258 sample quadrats. We detected 17 raptor species within our sample areas (at least 3 more species occur in the area, but were not detected). Eight species were seen frequently enough to allow analysis of macro-habitat selectivity, and all of these were significantly selective in their macro-habitat preferences (chi-square goodness of fit, p values < .001). Cottonwood, Douglas fir, and sageland habitats were used far more than expected under random association. Tilled cropland was the primary vegetative cover type in more randomly selected samples than any other cover type (129 = 30% of samples, tilled cropland = 35% of total area), but represented only 4% of samples where raptors were detected. Two sagebrush dominated quadrats featured the greatest diversity of detected species, one with four species and another with five.

We are currently witnessing the gradual loss of several historically productive bald eagle nesting areas, nesting areas located on private lands that are now being intensively developed. This is most apparent in the South Fork reach from Palisades Dam to Conant Valley, and highlights the importance of protected habitats under public ownership throughout the Snake River study area. In the past two years of searches for nesting raptors within this area, we have also documented the high value of riparian cottonwood forests and nearby Douglas fir forests for many other nesting birds of prey.

Introduction

This progress report documents the second year of a five-year project to monitor raptorial birds within the Snake River ecosystem of southeastern Idaho. The project goal is to develop monitoring tools that can be applied to conservation at several levels: nesting bald eagle populations, raptorial birds, and biological communities generally (see discussion in Whitfield et al. 1995).

Objectives

I. Determine bald eagle productivity and document habitat observations for bald eagle breeding areas within the Idaho portion of the Greater Yellowstone Ecosystem. Specific 1995 tasks within this objective are:
a. Complete bald eagle nesting area surveys for each breeding area.
b. Monitor and assess the effects of human disturbance to each breeding area as noted during activity and productivity surveys.
c. Provide preliminary identification of key use areas and important habitat use areas for the following bald eagle breeding areas: Swan Valley (18-IS-05), Antelope Creek (18-IS-11), and St. Anthony (18-IS-15). St. Anthony was substituted for Menan Buttes because of the difficulty of access to Menan Buttes in this high water year.

II. An overall goal of this five-year project is to develop an inventory and monitoring program for all raptorial birds of the Snake River study area (Species listed in Table 1). The 1995 objective is to continue Phase 1, presence/absence surveys with randomized sampling, to determine raptor species occurrence and broad-scale habitat relationships (see methods).
a. Develop preliminary presence/absence sampling regimes and select initial samples.
b. Identify broad-scale vegetation types within selected sample areas.
c. Complete presence/absence surveys for raptors within selected sample areas.
d. We have also added to the literature search completed in the 1994 progress report (Whitfield et al. 1995) by providing a synthesis of current raptor habitat management recommendations from the literature.

Study Area

The 119 mile long reach of Snake River corridor identified in the BLM and Forest Service 1991 Snake River Activity/Operations Plan is the core of the study area (figure 1). This area includes the South Fork of the Snake River from Palisades Dam beyond the confluence to Market Lake Canal, and Henry's Fork from St. Anthony to its confluence with the mainstem Snake. The study area is expanded to include upland habitats within 1 mile on each side of river. In preliminary studies, the investigators located breeding raptors which nest within this expanded area and rely in part upon the riparian bottom for foraging habitat.

The upper section of the South Fork below Palisades Dam flows through a mountain valley, Swan Valley, Idaho. It then flows into a rugged, deeply incised canyon approximately 26 miles in length. The lower South Fork and the Henry's Fork below St. Anthony meander

Table 1. Raptor species codes for raptorial birds to be inventoried and monitored in the Snake River study area.

Common Name	Scientific Name	Abbreviation	Number	Occurrence in Study Area[1]
Bald Eagle	Haliaeetus leucocephalus	Ha. le.	1	Known, this study
Golden Eagle	Aquila chrysaetos	Aq. ch.	2	Known, this study
Osprey	Pandion haliaetus	Pa. ha.	3	Known, this study
Northern Goshawk	Accipiter gentilis	Ac. ge.	4	Known, this study
Cooper's Hawk	Accipiter cooperii	Ac. co.	5	Known, this study
Sharp-shinned Hawk	Accipiter striatus	Ac. st.	6	Known, this study
Red-tailed Hawk	Buteo jamaicensis	Bu. ja.	7	Known, this study
Swainson's Hawk	Buteo swainsoni	Bu. sw.	8	Known, this study
Feruginous Hawk	Buteo regalis	Bu. re.	9	Potential
Northern Harrier	Circus cyaneus	Ci. cy.	10	Known, this study
Peregrine Falcon	Falco peregrinus	Fa. pe.	11	Known, this study
Prairie Falcon	Falco mexicanus	Fa. me.	12	Known, this study
Merlin	Falco columbarius	Fa. co.	13	Potential
American Kestrel	Falco sparverius	Fa. sp.	14	Known, this study
Turkey Vulture	Cathartes aura	Ca. au.	15	Known, this study
N. Saw-Whet Owl	Aegolius acadicus	Ae. ac.	16	Known, this study
Northern Pigmy Owl	Glaucidium gnoma	Gl. gn.	17	Known, reports
Western Screech Owl	Otus kennicottii	Ot. as.	18	Known, reports
Flammulated Owl	Otus flammeolus	Ot. fl.	19	Known, this study
Short-eared Owl	Asio flammeus	As. fl.	20	Suspected
Long-eared Owl	Asio otus	As. ot.	21	Known, this study
Great Horned Owl	Bubo virginianus	Bu. vi.	22	Known, this study
Great Gray Owl	Strix nebulosa	St. ne.	23	Potential
Barred Owl	Strix varia	St. va.	24	Potential
Boreal Owl	Aegolius funereus	Ae. fu.	25	Potential
Burrowing Owl	Athene cunicularia	At. cu.	26	Potential

across broad, braided flood plains. Much of the South Fork in these lower reaches is contained by a dike system.

Much of the river is bordered by riparian cottonwood gallery forests recognized as among the largest and most intact in the western United States. Beyond the floodplain, landscapes on each side of the river include a rich diversity of vegetative cover and topographical relief: conifer and aspen covered foothills, park-like pasture lands and cultivated crop lands; precipitous canyon walls; sage, mountain mahogany, and juniper covered slopes; and steep, rocky mountains. The lower reaches feature biologically rich sloughs and wetlands. The South Fork and lower reach of the Henry's Fork are recognized as a primary biological asset of the Greater Yellowstone Ecosystem.

Bald eagles are monitored within a larger region, the Idaho portion of the Greater Yellowstone Ecosystem. This area includes Southeast Idaho west to Interstate 15 from the Montana border to Idaho Falls, and the Snake River watershed south to the Wyoming border

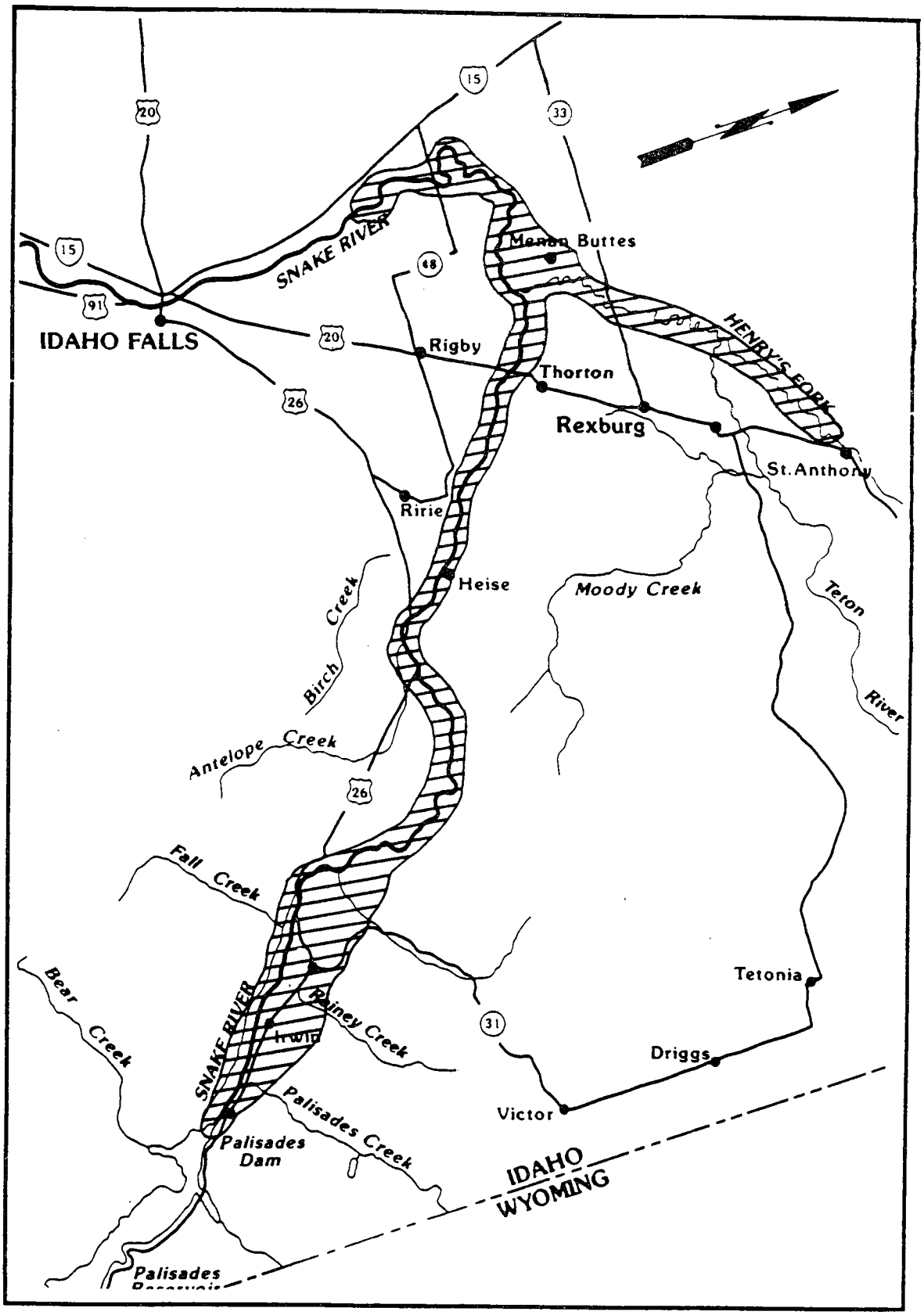

Figure 1. Snake River study area. This map is taken from the Snake River Activity/Operations Plan (USDI BLM and USDA Forest Service 1991). Scale 1 : 500,000

at the upper end of Palisades Reservoir. This larger region includes the Snake River study area plus the upper Henry's Fork in Island Park, outlying lakes like Sheridan Reservoir, and Henry's Fork tributaries such as the Falls and Teton River watersheds.

Methods

Bald Eagle Monitoring

All known and suspected bald eagle breeding areas are surveyed to collect the following data: nest occupancy, breeding activity, breeding success, and number of advanced young produced. All nest sites are visited a minimum of twice: early for an activity (incubation) check and later for a productivity check. In most cases, additional activity checks are necessary to more clearly document activity or to locate new alternate nest sites. Nesting chronology is monitored where reliable data can be obtained.

Activity checks are completed by a combination of aerial and ground or boat surveys. Most early ground checks are from long distance with spotting scopes to avoid disturbance to adults. Later visits are made to measure productivity at active nest sites. Nestlings are banded during this visit where nest trees can be safely climbed. Our experience of 11 years of monitoring bald eagle nesting activity and productivity in this region suggests an area-specific strategy for bald eagle monitoring (see Appendix Table 1, Whitfield et al. 1995).

Definitions used for bald eagle reproductive terminology are as follows:
Breeding area. This refers to the area used by one nesting pair of adult bald eagles and containing one or more nest sites.
Occupied breeding area or nest. A breeding area, or nest within a breeding area, with evidence of bald eagle use during part of the breeding season. Occupancy occurs if a) two adults are seen at or near an empty nest within the breeding season, b) one adult and one subadult are seen at or near a nest during the breeding season and there are displays of reproductive behavior, c) there is clear evidence of recent nest repairs or new nest construction, or d) observations that identify the nest as active as defined below.
Active breeding area or nest. Incubating pair. A breeding area, or nest within a breeding area, with clear evidence of bald eagle reproductive effort during the breeding season. An active nest is one where incubation, eggs, or nestlings are observed. Incubation posture does not necessarily infer incubation, and actual incubation should be assumed only if an adult remains in the posture for several hours or an exchange of incubation duty by adults is observed. (Revised GYE Bald Eagle Working Group guidelines in draft substitute Active with the term "Incubating Pair".)
Successful breeding area or nest. A breeding area, or nest within a breeding area, where advanced young are produced. Advanced young are young of the year at or near fledging age.

Development of Raptor Monitoring Program

Our raptor inventory is iterative over the five years of the project, with an additive progression through phases as the data is collected and analyzed. We include here a summary

of the methods to be used over the life of the project to provide perspective for each year's work (also see Whitfield et al. 1995). Sampling methods, including raptor species detection and estimation of relative abundance and breeding productivity, must be species specific.

Once our inventory has provided a reliable baseline, we will develop a long-term monitoring program for the raptors of the South Fork study area. This program will employ a sampling design that will yield statistically reliable species-specific measures of breeding pair density and productivity. Time and cost efficiency will be emphasized to ensure that long-term monitoring is practical. Suggestions for applicability to other areas and other biological groups will be made.

Breeding Raptor Detection.

We apply species-specific raptor detection methods. We provided a literature review of raptor detection methods in Whitfield et al. 1995. We will also analyze delectability models from a statistical perspective as the project progresses.

Raptor Inventory.

Our raptor inventory occurs in two phases as follows:

Phase 1. Presence/Absence Sampling. Sample sites are selected to cover a broad array of biological and physical attributes; such coverage will help assure adequate representation of species composition and distribution over the study area. Sampling must be exhaustive enough to minimize under-sampling effects on patterns while allowing true patterns or gradients across the study area to be identified, described and predicted. With respect to monitoring, sampling must also ensure that study-wide trends and change can be distinguished from localized fluctuations (McKenzie et al. 1991). Hence the number, placement, and size of the sample sites will require careful consideration from both the biological and statistical perspectives.

In 1995, we entered all potential samples, all square mile sections within the study area, into a Latin Square table with samples containing similar habitats grouped within the table. We then randomly selected samples according to a Latin Square plus 1 design. We used mapped legal sections because there are often section markers on the ground that aid in sample location. We selected from all square mile sections that were at least 50% within 1 mile of the river. We then individually sampled all 40-acre quadrats (16 per square mile section) within selected sections.

Data recorded at each sample site consist in part of the following: sample date and geographic location, stratum type, habitat patchiness with estimated relative percentages of patch-type, raptor species present, and the within-site geographical location of individuals, nest sites and the like. Statistical analyses will provide information on species composition and habitat associations. These results will be used to predict geographical distributions of presence for individual species and species assemblages over the study area.

Phase II. Estimating Relative Abundance of Nesting Pairs. Data and results obtained from this survey will be invaluable for the second phase of the project: estimating relative abundance and distribution of key species This phase will commence in the third year of the project, 1996. We will also begin to monitor raptor nest sites to measure nesting activity and productivity parameters in 1996.

Habitat description

For Phase 1 surveys (presence/absence) completed in 1995 and reported here, we characterized each 40 acre sample quadrat by general vegetation cover type according to the system developed by Ulliman et al. (1991), which includes 30 cover types (Table 2). We indicate the dominant cover type found within each quadrat, with recognition that many quadrats feature a complex mosaic of vegetative cover types (Appendix Table 5).

As the project matures, our habitat measures will become more refined to characterize features selected by individual raptor species. We hope to characterize, at a landscape level, habitat features found within areas estimated to include the home ranges of nesting raptor pairs. We will also measure habitat features around all nest sites to determine those features of importance to nest occupancy and success.

Table 2. Snake River study area vegetative cover types after Ulliman et al. (1991).

Level I	Level II	Level III
1 Urban	11 Residential	111 Residential
	12 Commercial	121 Commercial
	13 Industrial	131 Gravel pits, quarry
	14 Transportation	141 Roads, transportation services
2 Agriculture	21 Cropland, Pasture	211 Tilled cropland
		212 Permanent pasture
	24 Other	241 Buildings and associated areas
		242 Irrigation canals
		243 Dikes and dams
3 Rangeland	31 Grassland	311 Upland grasslands
	32 Shrubland	321 Sagebrush-bitterbrush
		322 Mountain mahogany
		323 Upland shrubland
4 Forestland	41 Deciduous	411 Aspen, closed (› 75% cover)
		412 Aspen, open (‹ 75% cover)
	42 Evergreen	421 Douglas-fir
		422 Juniper
5 Water	51 Riverine	511 Upper perennial
		512 Lower perennial
6 Riparian	61 Nonwoody	611 Grasses
		612 Sedges
	62 Woody	621 Willow
		622 Dogwood
		623 Cottonwood
7 Barrenland	74 Exposed Rock	741 Bedrock outcrops
		742 Scree slopes